

The Math Says Middlemen Own Online Advertising's Future

The oil in the Web shopping machine

By Mark Anderson

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31 October 2007—The mainstay of the US \$14 billion online-advertising industry—the “sponsored links” that appear alongside [Google \(http://www.google.com\)](http://www.google.com) and [Yahoo \(http://www.yahoo.com\)](http://www.yahoo.com) search results—contains an inherent inefficiency that is destined to give birth to third-party search-term auctioneers and fuel the growth of so-called [mediators \(http://www.spectrum.ieee.org/oct06/4572\)](http://www.spectrum.ieee.org/oct06/4572), like the Web sites [Shopzilla \(http://www.shopzilla.com\)](http://www.shopzilla.com) and [Shopping.com \(http://www.shopping.com\)](http://www.shopping.com).

This unorthodox conclusion emerges from a new [study \(http://adsabs.harvard.edu/abs/2007arXiv0709.0204S\)](http://adsabs.harvard.edu/abs/2007arXiv0709.0204S) by engineers at the University of California, Los Angeles, in which a rigorous subset of mathematical laws—first formulated by John Nash (the subject of the 2001 film *A Beautiful Mind*)—was applied to the volatile pay-per-click advertising marketplace. Specifically, Sudhir Kumar Singh and his coauthors at UCLA’s department of electrical engineering employed the game-theory concept of Nash equilibrium, in which one’s strategy continually [shifts \(http://www.spectrum.ieee.org/nov04/4017\)](http://www.spectrum.ieee.org/nov04/4017) because one’s opponent’s strategy is continually shifting.

Typically, searches in Google or Yahoo produce a string of ads (sponsored links) along the side of the screen and across the top. Those links are generated by advertisers placing bids—sometimes \$2 or more per click—on phrases like “digital camera” or “hybrid car.”

Economists studying auction behavior, says Vwani Roychowdhury, Singh’s advisor and study coauthor, have used the Nash equilibrium concept to determine auctions’ outcomes. The group’s work, he says, “shows in a formal way why mediators are necessary if this way of advertising survives.”

The authors point out that most searches are not as generic as the so-called “AdWords” that companies buy. Though a company might purchase the phrase “digital camera” a potential customer might search for “digital camera Bluetooth accessories in St. Louis,” for example. Often as a result, the sponsored links miss the point altogether, and direct this user with a specific request toward catchall sites, such as national online electronics retailers, that are of no use to the person.

Roychowdhury uses the example of a specialized market, such as cellphone headsets for the hearing impaired. A hypothetical company that sells these might be able to afford to appear in Google’s sponsored links section for queries on “hearing impaired.” But, he says, very few of the people searching on a term that generic would be in the market for a gadget that specific.

Yet, if the same company put in a bid to appear in the sponsored links section for any searches involving the word “cellphone,” they’d be up against the likes of Nokia, Amazon, and Verizon. They couldn’t afford to compete with the ad budgets of such big companies, and they shouldn’t have to, because the hypothetical headset company is not in direct competition with these retail giants.

Instead, Roychowdhury says, a third-party company, called a lead generator or "leadgen," ideally would exist to aggregate, say, AdWords specifically for cellphones and cellphone accessories. The hearing-impaired headset company would then pay the leadgen company. The leadgen company, in turn, would place its bids on all conceivable forms of cellphones and cell accessory-related queries with Google and Yahoo.

"This leadgen company could take the traffic when you search for 'headset,'" Roychowdhury says. "And on their page, they'd feature [headsets] for hearing-impaired people."

Paul Ryan, CEO of the home-improvement referral site Done Right! (<http://www.doneright.com>) (and a consultant on a business venture for Roychowdhury) says the UCLA group's approach rigorously shows that well-run third-party AdWord auctioneers will always boost the bottom line for both the search-engine company and for advertisers.

The study shows that Google AdWord auctions are only a great deal for a certain limited set of advertisers, says Ryan. "This is what the paper's all about," he says. "It's inevitable that the auction-based model that AdWords and Yahoo Search Marketing uses will cause the rise of mediators."

At least some in the Internet business have already intuited the importance of mediators. In 2005, to the surprise of many analysts, eBay bought Shopping.com (<http://www.thestandard.com/internetnews/003081.php>) for \$634 million. Roychowdhury's research answers why.

About the Author

MARK ANDERSON is a freelance science and technology writer based in Northampton, Mass.